on the 31st. This was 3° higher than the highest temperature recorded during March, 1912. The lowest temperature was −7° at Tamarack, which occurred on the 1st. This was 10° higher than the lowest during March, 1912, at the same place. The highest monthly mean was 66.2° at Mammoth, and the lowest was 21° at Tamarack.

PRECIPITATION.

The precipitation was much below normal. The following table gives the average precipitation and departure from normal for each March from 1897 to 1913, inclusive:

Year.	Mean.	Departure.	Year.	Mean.	Departure.
	Inches.	*Inches.*		*Inches.*	*Inches.*
1897	3.98	−0.76	1906	9.19	+4.45
1898	0.66	−4.08	1907	10.67	+5.93
1899	6.10	+1.36	1908	1.49	−3.25
1900	2.38	−2.36	1909	3.56	−1.18
1901	1.01	−3.73	1910	2.43	−2.31
1902	3.39	−1.35	1911	6.02	+1.28
1903	5.80	+1.06	1912	5.17	+0.43
1904	8.52	+3.78	1913	2.16	−2.58
1905	5.42	+0.68			

The greatest monthly precipitation was 9.45 inches at Nellie. At nine stations no precipitation was recorded during the month. The greatest 24-hour rainfall was 3.35 inches at Greenville on the 22d.

Snowfall.—March was a month of less than average snowfall. There were no heavy falls, except on the 22d. On the other hand, there were no warm spells, no rapid melting, and no excessive evaporation. During the third week the depth and area of the snow cover were materially increased, but, nevertheless, not enough snow fell to insure a bountiful supply of water during the coming summer. The State could well stand two or three heavy snowfalls in the mountains. The snow is well packed, at a low temperature, and the water content high. The loss by evaporation and melting was less than in a normal March. There has been no waste of water.

SNOW IN THE MOUNTAINS.

The following table shows the depth of snow on the ground at Summit on given dates in March during the period 1907 to 1913:

1907	104	1911	222
1908	116	1912	26
1909	201	1913	52
1910	65		

SUNSHINE.

The following gives the hours of sunshine and percentages of the possible:

Stations.	Hours.	Percentage of possible.	Stations.	Hours.	Percentage of possible.
Eureka	124	34	Sacramento	308	83
Fresno	300	81	San Diego	260	70
Los Angeles	302	81	San Francisco	261	70
Mount Tamalpais	270	73	San Jose	269	73
Red Bluff	253	70	San Luis Obispo	251	67

NOTES ON THE RIVERS OF THE SACRAMENTO AND LOWER SAN JOAQUIN WATERSHEDS DURING THE MONTH OF MARCH, 1913.

By N. R. TAYLOR, Local Forecaster.

Sacramento watershed.—From the mouth of the Pitt River to tidewater the Sacramento River was lower than for any previous March of which there is an authentic record. At Red Bluff, Colusa, Knights Landing, and Sacramento City the average stages for the month were 5.1, 8.0, 7.0, and 9.6 feet, respectively, below the averages which have been maintained at these places during all previous years of record.

The average stage of the American River equaled that of the corresponding month of 1912, when this stream was the lowest on record for the month.

In the Feather-Yuba watershed all previous low-water records for March were broken by from 0.5 of a foot to nearly 1 foot.

Light scattered showers occurred in the upper reaches of the Sacramento River during the first decade of the month, and rains, more or less general, fell throughout the drainage basin of the Sacramento Valley from about the 17th to 24th, inclusive. The rain was moderately heavy north of Red Bluff, causing rises ranging from 2.5 at Vernon to as much as 4 feet at Red Bluff between the 22d and 25th. Below the mouth of the Feather River the swell amounted to little more than 1 foot.

Lower San Joaquin watershed.—The stages of the Mokelumne and the Upper Cosumnes Rivers equaled the low-water stages that obtained during March, 1912. In all other streams in this watershed the average stages were the lowest recorded during the month of March. In the Lower San Joaquin itself, north of the Stanislaus, the river averaged nearly 10 feet below the normal for the past 15 years and over 1 foot below the lowest stages previously recorded during the month.

Rains, mostly light, were general from the 18th to about the 25th, inclusive, causing slight rises in all streams, which were still in progress at the close of the month.

The effects of snow water on run-off were not apparent at any time during the month.

NOTES ON THE STREAMS OF THE UPPER SAN JOAQUIN WATERSHED.

By W. E. BONNETT, Local Forecaster.

Deficient precipitation and cool weather, which prevented any considerable melting of mountain snows, have kept the streams of the Upper San Joaquin watershed at very low stages. Average gage heights are slightly higher than those of February at all points but they fall far short of the March average for the last seven years and were everywhere much lower than the lowest previously recorded March stages, namely, those of 1908.

At Merced Falls the average stage was 0.7 foot, the seven-year average for March is 1.4 feet, and the monthly range was from 0.4 to 1.1 feet. At Friant the average was −0.4, the seven-year average is 1.3 feet, and the monthly range −0.6 to 0.1 foot. There was no change at Firebaugh, the stage remaining at −0.9 foot throughout the month as compared with a seven-year mean of 3.5 feet. At Piedra, on the Kings River, the mean stage was 4.9 feet, the lowest for many years, and the monthly range was from 4.6 to 6 feet. The highest stages for the month at all points occurred on the last day following some warm days.

While the stages for March this year were lower than those of the same month in 1912, they are only slightly lower, but the situation with reference to the demand for water is vastly different than it was at this time last year. Somewhat more than 3 inches of rain fell over this portion of the valley in March, 1912, and it was followed by almost 2 inches in April, so that the ground was in excellent condition from the rains. There was consequently very little demand for irrigation water until the normal summer rise in the streams began in May.

In the month just closed the average rainfall in this vicinity was less than one-fourth of an inch, and there is a pressing demand for several times the water for irrigation that is now available. A flow sufficient to fill all ditches probably will not be available much before May 1, unless April is unusually warm, and irrigators are greatly disturbed by the shortage.